The video S/N, audio S/N and audio distortion values are shown in accompanying Table II as a function of video deviation for reception through 20 and 15 MHz receive bandwidths.

TABLE II

Video and Audio Noise Performance

	C/N_O= 102.7dB					
	Rx BW= 20 MHz			RX BW= 15 MHz		
	Audio1= 8.3 MHz	Audio2= 6.8 MHz		Audio1= 6.8 MHz	Audio2= 5.8 MHz	
	Video S/N	Audio S/N	Audio Dist.	Video S/N	Audio S/N	Audio Dist.
Δf=4.0 MHz	56.5 dB	49.4 dB	0.72%	56.5 dB	49.6 dB	0.72%
Δf=3.5 MHz	55.0 dB	48.6 dB	0.74%	55.1 dB	49.7 dB	0.72%

The theoretical video Signal-to-Noise ratio (S/N_{vid}) is given by the following formula:

$$S/N_{vid} = 6 * C/N_o * (\Delta f/f_m)^2 * 1/f_v * Q$$

where: C/N_o = Carrier-to-Noise Density ratio

Δf = Peak Frequency Deviation

f_m = Maximum Baseband Frequency, 5.0 MHz

f_v = Video Bandwidth, 5.0 MHz (Unified Weighting)

Q = Pre-emphasis and Noise Weighting Factor, 14.8 dB.

The use of this formula predicts a theoretical video S/N of 56.4 dB for 4 MHz deviation and a value of 55.2 dB for a deviation of 3.5 MHz which agree very well with the values measured. The slightly better than theoretical results shown for transmission through the 20 MHz filter can be attributed to equipment tolerances and irreducible measurement errors.

The theoretical value of audio Signal-to-Noise ratio (S/N_{aud}) is given by the following formula:

$$S/N_{aud} = 3/4 * C/N_o * 1/f_a * (\Delta F_a/f_{sc})^2 * (\Delta F_{sc}/f_a)^2 * P_1$$

where: f_a = Audio Baseband Bandwidth, 15 kHz

ΔF_a = Peak Carrier Deviation due to Sub-carrier, -17 dB referenced to peak-to-peak video

f_{SC} = Sub-carrier Frequency, 8.3 or 6.8 MHz

ΔF_{SC} = Peak Sub-carrier Deviation, 75 kHz

P_1 = Wideband Pre-emphasis Improvement at Sub-carrier Frequency, 3.5 dB

The use of this formula predicts a theoretical audio S/N of 53.9 dB for transmission through the 20 MHz filter with 4 MHz deviation and 52.7 dB for 3.5 MHz deviation. For transmission through the 15 MHz filter the measured audio sub-carrier frequency was 6.8 MHz and a theoretical S/N of 55.6 dB was computed for 4 MHz deviation and a value of 54.4 dB was computed for 3.5 MHz deviation. The measured values are on the order of 5 dB lower than that predicted theoretically. Examination of the received IF spectrum indicated that the sub-carriers were being truncated and reduced in level by the receive IF filter. This truncation occurs in normal operation and is in no way associated with the reduced deviation being addressed in this Appendix. Taking this factor into account yielded measured S/Ns that were on the order of 1.5 dB less than theory.

Conclusions

This experimental investigation has demonstrated that it is possible to utilize reduced bandwidth channels for the Broadcast Auxiliary Service with a minimal effect, that is a 1.4 dB reduction in Signal-to-Noise ratio, on video and audio quality. The subjective impairment due to the reduced bandwidth operation will be negligible and in many instances will be indistinguishable from normal apparatus noise. In actual operation, it is expected that Electronic News Gathering transmitters are run at the maximum allowable power output so that a 1.4 dB reduction in S/N will be all but unnoticeable for the majority of links.

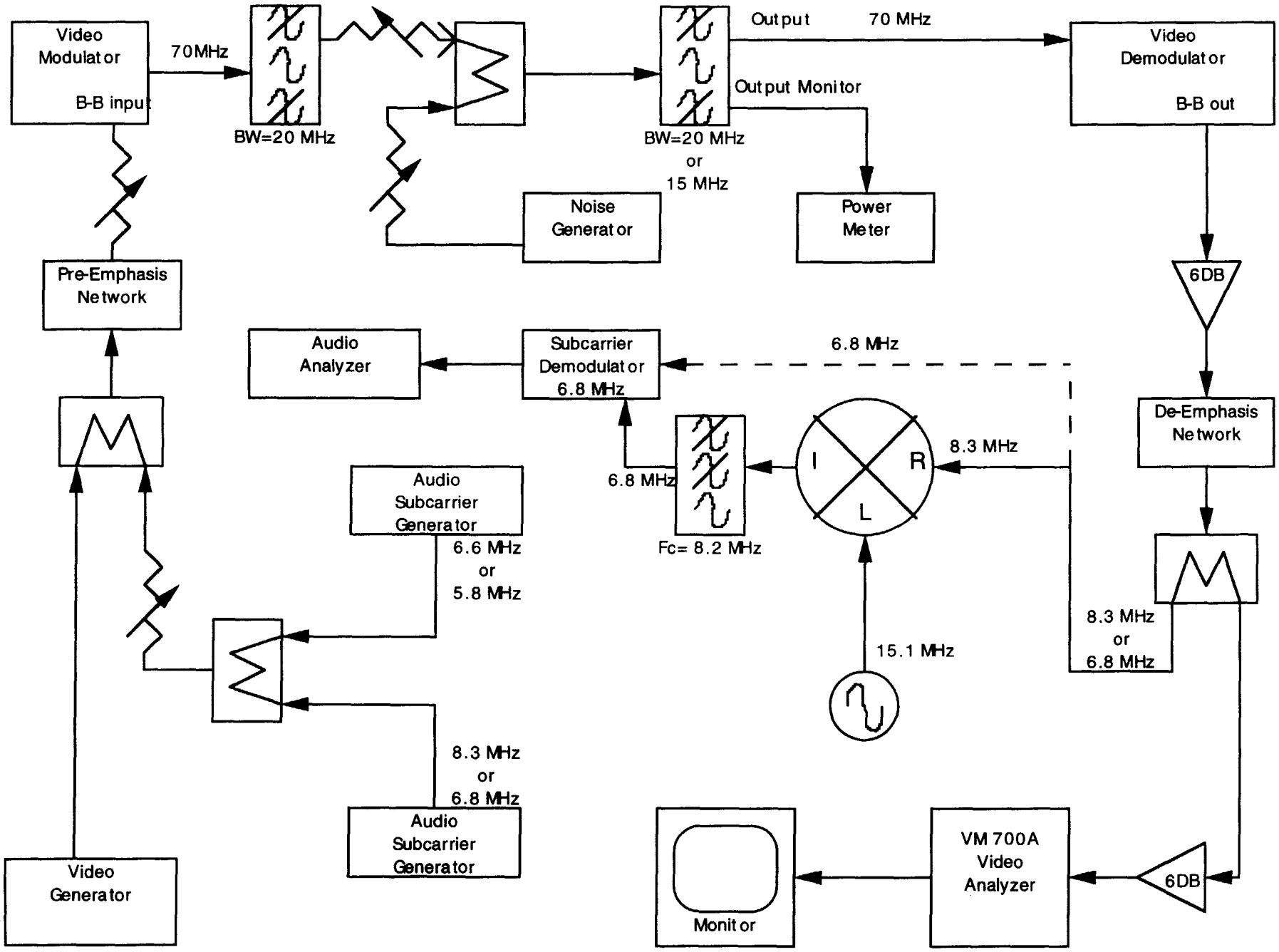

Figure III-1 Experimental Test Setup

AFFIDAVIT

I hereby certify that I am the technically qualified person responsible for the preparation of the engineering information contained in the Appendices, that I am familiar with Parts 21, 25 and 74 of the Commission's Rules as well as with the technical characteristics of the radiocommunications systems described in the Appendices, that I have either prepared or reviewed the engineering information submitted in the Appendices, and that it is complete and accurate to the best of my knowledge and belief.

Jeffrey B. Binckes

Date: May 5, 1995